

REMARKS

The Office Action mailed on January 23, 2008, has been reviewed and the comments of the Patent and Trademark Office have been considered. Prior to this paper, claims 1-12 were pending. By this paper, Applicant cancels claim 2 and adds claim 13. Therefore claims 1, 3-13 are now pending.

Applicant respectfully submits that the present application is in condition for allowance for at least the reasons that follow.

Acknowledgement of Priority Papers is Requested

Applicant requests that an examiner check box 12a on the first page of an Office Action Summary, acknowledging that all of the certified copies of the priority document have been received.

Interview of April 23, 2008

Examiner Suitte is thanked for extending the courtesy of an interview to Applicant's representatives on April 23, 2008, where the present invention was discussed, but no agreement was reached.

In view of the Personal Interview held on April 23, 2008, Applicant submits that the above provides a complete and proper recordation of the substance of the interview, per MPEP § 713.04.

Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 1-12 stand rejected under 35 U.S.C. § 112, first paragraph, “as failing to comply with the enablement requirement [and as containing] subject matter which was not described in the specification in such a way as to enable one skilled in the art which it pertains, or to which it is most nearly connected, to make and/or use the invention.” Specifically, the Office Action states that it “is unclear how the nitrogen concentration is monitored inside the recirculation chamber such that a constant nitrogen concentration is achieved.”

Applicant traverses this rejection.

First, no claim recites that “nitrogen concentration is monitored.” In fact, the whole purpose of the invention is to eliminate the use of a nitrogen concentration sensor or the like. Thus, there is a fatal disconnect between the entire premise of the enablement rejection and the claims.

Second, the specification specifically teaches that variables other than nitrogen concentration are instead monitored and/or controlled, thus vitiating any need to monitor nitrogen concentration. As detailed, nitrogen concentration is kept “constant” / controlled to a target nitrogen concentration by controlling Qph to a threshold value; Qph being a *flow rate* of purged hydrogen gas through purge valve 8. In an exemplary embodiment, the purge valve 8 discharges to atmosphere hydrogen gas that has already passed through the fuel cell stack 1 which is “contaminated” with nitrogen. The flow rate Qph through the purge valve 8 is in essence the flow rate of hydrogen contaminated with nitrogen discharged to atmosphere.

If the *flow rate* of purged gas through the purge valve 8 is kept constant / controlled as claimed, Applicant has learned through his efforts to advance the arts, that in the fuel cell system disclosed, the nitrogen concentration in the system may be controlled / kept constant in the device according to Applicant’s teachings. In this regard, Fig. 4 depicts an exemplary graph detailing how nitrogen concentration changes with *flow rate* (Qph) through purge valve 8. As may be seen from Fig. 4, the Applicant has learned that in a device according to his teachings, if Qph is held constant, nitrogen concentration is in turn held constant / controlled.

This can be validated, way of example only, and not by way of limitation, by comparing Qph to empirical values of nitrogen concentration although, again, in embodiments of the present invention, it is not necessary to determine a nitrogen concentration, as controlling Qph is sufficient to control / maintain constant, nitrogen concentration.

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Having identified why it is important to control Qph, Applicant has developed a device and method to keep Qph constant. Why is this important? Applicant has learned that if the opening amount of purge valve 8 is kept constant, Qph (the flow rate of the gas discharged to atmosphere) of hydrogen gas that has already passed through the fuel cell stack 1 *is not constant*, due to pressure and temperature variations, *etc.*, which in turn permits the amount of nitrogen to vary. That is, contrary to intuition, maintaining a valve opening at a constant value does not result in a constant Qph. Because the amount of nitrogen varies in such a scenario, a user of the fuel cell system might be forced to release more gas through purge valve 8 *than necessary* to account for this variation. In this regard, Applicant's invention is directed towards overcoming a basic problem that he has learned – flow rate through a purge valve tends to change even though the opening of the purge valve is maintained to be constant, thus permitting the nitrogen concentration to vary. Specifically, as is shown in Figs. 5-7, and detailed on pages 7-9, Qph for a constant valve opening amount can vary due to fuel gas supply pressure (Fig. 7), fuel gas temperature downstream of the fuel cell stack 1 (Fig. 6), *etc.* Thus, by controlling the purge valve to maintain Qph at a threshold value, to combat the changes due to pressure, temperature, *etc.*, the nitrogen concentration in the system may be controlled / held constant.

* * * * *

Control of the purge valve to control Qph may be based on empirical data and known relationships between purged hydrogen flow rates at various operating conditions (pressure, temperature, *etc.*) and the amount of valve opening. Certainly, the skilled artisan was enabled

to empirically test a system such as that detailed in the specification to identify how to control the purge valve under varying conditions to control Qph. Certainly the skilled artisan was enabled to empirically test a system such as that detailed in the specification to identify how a nitrogen concentration varied with varying Qph.

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If the claims are to be again rejected as failing the enablement requirement, it is submitted that the PTO must demonstrate, through clear evidence, at a minimum, that:

- 1) The skilled artisan was not enabled to control adjustment of a purge valve opening to maintain a constant flow rate through the purge valve under varying pressure and temperature, according to the teachings of the specification.
- 2) Maintaining a constant flow rate through the purge valve as taught in the specification, in a fuel cell system as taught in the specification, would not result in a nitrogen concentration being maintained at a target concentration, in a fuel cell system as taught in the specification.

Moreover, enabling support is not limited to the four corners of the specification and is not measured by the perceptions of an individual examiner. Rather, the standard is that of the ordinarily skilled artisan and the source of enabling information includes that which such an artisan presumably knows. That is, the correct test for enablement is whether the skilled person could make and use the claimed invention “from the disclosure in the [specification] coupled with information known in the art without undue experimentation.” (*United States v. Teletronics*, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988); see MPEP § 2164.01.)

Still further, the burden is on the examiner. In order to make a rejection, an examiner has the initial burden to establish a reasonable basis to question enablement. (MPEP § 2164.04.) It has long been the rule that an examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled. (*In re Wright*, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).)

Applicant respectfully submits that the statement in the Office Action does not satisfy this burden. Not only is the statement insufficient and unreasonable on its own, it contradicts office action's position on the prior art. That is, the Office Action states that the prior art anticipates every claim now pending (i.e., teaches an embodiment that has each and every element of the pending claims, exactly as recited). Yet a claim is anticipated only if each and every limitation is found in a single prior art reference. (*Verdegaal Bros. v. Union Oil*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); see MPEP § 2131.) Indeed, to be anticipatory, a reference must contain an "enabling disclosure." (*In re Hoeksema*, 399 F.2d 269, 273 (CCPA 1968).)

Consequently, the position of the Office Action on § 112 enablement contradicts its position on the prior art. If the PTO truly believes that the claimed fuel cell systems are anticipated by the prior art, then the § 112 enablement rejection should be withdrawn. On the other hand, if the PTO truly believes that an ordinarily skilled artisan (with the benefit of Applicants' claims and specification along the presumptive knowledge of the prior art) would be incapable of making and using the claimed invention without undue experimentation, then the prior art rejections should be withdrawn and the PTO must provide the required reasoned explanation for doubting enablement.

In summary, Applicant respectfully submits that the Office Action is applying an incorrect standard for enablement. A person of ordinary skill in the art – given Applicant's specification – would have been able to make and use the claimed inventions as of Applicant's original filing date without undue experimentation.

Rejections Under 35 U.S.C. § 112, Second Paragraph

In the Office Action, claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. As seen above, claim 1 has been amended, without prejudice or disclaimer, and Applicant respectfully requests reconsideration.

Rejections Under 35 U.S.C. § 102

Claims 1-12 stand rejected under 35 U.S.C. § 102 as being anticipated by Simpson (U.S. Patent Application Publication No. 2004/0161657). In response, in order to advance prosecution, and without prejudice or disclaimer, Applicant amends claim 1 to include the recitations of claim 2 (effectively placing claim 2 into independent form).

Applicant relies on MPEP § 2131, entitled “Anticipation – Application of 35 U.S.C. 102(a), (b), and (e),” which states that a “claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Section 103 amplifies the meaning of this anticipation standard by pointing out that anticipation requires that the claimed subject matter must be “*identically* disclosed or described” by the prior art reference. (Emphasis added.) It is respectfully submitted that Simpson does not describe each and every element of any claim now pending.

As a preliminary matter, as detailed above, there is an inconsistency here rejecting claims, on the one hand, as lacking enablement, and, on the other hand, rejecting those very same claims as being anticipated. The prior art cannot be anticipatory to a claim that allegedly could not have been implemented by the ordinary artisan.

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Claim 1 (former claim 2) recites a controller for adjusting a valve opening of a purge valve so that a nitrogen concentration of the fuel gas in the recirculation system is controlled to be maintained at a target nitrogen concentration. Claim 1 also recites that the controller is adapted to reduce the valve opening of the purge valve if a flow rate of fuel in the fuel gas passing through the purge valve is more than a threshold set in accordance with operation conditions of (i) the fuel cell system and (ii) the valve opening of the purge valve.

Simpson does indeed disclose a purge control device 72 that purges anode exhaust from a recirculation line. Simpson, however, does not teach setting a threshold value of a

flow rate through a purge valve based on operation conditions of the fuel cell system and valve opening amount of a purge valve, at least not to maintain a nitrogen content as claimed.

The Office Action alleges that paragraph 0046 of Simpson presents an anticipatory teaching regarding the recitations of formerly pending claim 2 (now claim 1). However, there is nothing in paragraph 0046 that teaches, *exactly as claimed*, setting a threshold value of a flow rate through a purge valve based on operation conditions of the fuel cell system and a valve opening amount of a purge valve. In the Office Action, nothing specific in paragraph 0046 is identified as corresponding to the teachings of formerly pending claim 2. Paragraph 0046 merely details opening and closing of a purge valve based on cell voltage, not flow rate through the valve. Simpson does not teach increasing or decreasing the valve opening of the purge valve based on the flow rate passing through the purge valve, let alone based on a threshold of the flow rate. Thus, paragraph 0046 decidedly does not teach, in an anticipatory manner, the recitations of claim 1.

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For a claim to be anticipated, each and every element must be found, either expressly or inherently described, in a single prior art reference. Because Simpson does not teach adjusting a purge valve based on a flow rate as the flow rate relates to a threshold, Simpson cannot anticipate claim 1, and thus anticipates no claim now pending.

New Claim

Applicant has add new claim 13. New claim 13 is a method claim that is allowable for at least the same reasons that make claim 1 allowable.

Conclusion

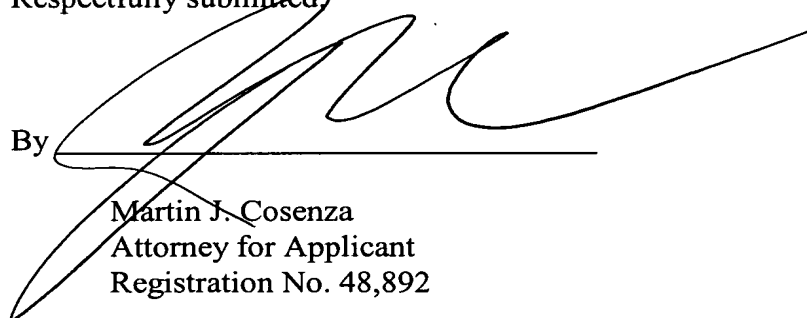
Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Suite is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

By


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